

## VEHICLE MOUNTED DISPLAY APPARATUS AND METHOD

FIELD OF THE INVENTION

This invention relates generally to vehicle-mounted displays and methods therefor and, more particularly, to a vehicle-mounted display apparatus and method of displaying a sequence of images from a vehicle.

DESCRIPTION OF RELATED ART

Vehicle advertising has become an increasingly popular form of advertisement. Typically, such advertising essentially functions as a mobile billboard mounted on the bed of a truck or roof of a car. Such displays can also be towed on a trailer behind a vehicle and are often illuminated with exterior lights for nighttime viewing by pedestrians and occupants of other vehicles.

However, current methods of vehicle advertising display a single image on each display surface and lack the ability to hold a viewer's attention beyond an initial viewing. For example, a person sitting in traffic near such a display will likely read the advertisement only once, although the display may remain in view for a considerable amount of time.

Another drawback to current methods of mobile advertisement is the difficulty in changing the displayed image. The time and effort required to change images can make frequent changes economically impractical.

5       In addition, current systems do not offer the flexibility of easily being able to reconfigure the arrangement of images displayed. For example, a three-sided rooftop sign cannot easily be adapted to show a fourth image.

10       The present invention satisfies these needs, and provides other, related, advantages.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a method and apparatus for displaying sequences of images on a vehicle-mounted display.

It is a further object of the present invention to provide an apparatus and method for displaying sequences of images on a vehicle-mounted display by rotating display surfaces relative to a generally horizontal vehicle surface.

It is a further object of the present invention to provide an apparatus and method for displaying sequences of images on a vehicle-mounted display using multiple multi-pixel display surfaces.

The foregoing and other objects, features, and advantages of the invention will be apparent from the following, more particular, description of embodiments of the invention, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with one embodiment of the present invention, a vehicle display apparatus is disclosed. The invention, a vehicle display apparatus comprises a vehicle, at least one vehicle display apparatus coupled to the vehicle and adapted for displaying at least one sequence of visual images, and means coupled to the vehicle for generating the at least one sequence of visual images.

In accordance with another embodiment of the present invention, a method is disclosed for displaying at least one sequence of visual images from a vehicle. The method comprises the steps of providing a vehicle, coupling at least one display surface to an exterior surface of a vehicle, and displaying at least one sequence of visual images on the at least one display surface.

In accordance with another embodiment of the present invention, a method is disclosed of displaying images from a vehicle. This method comprises the steps of providing a vehicle and attaching a housing on the vehicle rooftop. The housing is adapted to support a variable number of television screens. This method further comprises mounting a plurality of television screens on the housing so that from any direction at least one of the screens is visible by pedestrian observers, generating a plurality of video

signals, and transmitting each of the plurality of video signals, and transmitting each of the plurality of signals to a corresponding one of the plurality of television screens.

BRIEF DESCRIPTION OF THE DRAWINGS

**Figure 1** is a perspective view depicting a vehicle  
5 display apparatus according to one embodiment of the  
present invention.

**Figure 2** is a cross-sectional view of the vehicle  
display apparatus of **Figure 1**.

10 **Figure 3** is a top view of a vehicle display apparatus  
similar to the display apparatus of **Figure 1** with an arrow  
showing a rotational motion of the vehicle display housing.

15 **Figure 4** is a perspective view depicting a vehicle  
display apparatus with plasma screens on a vehicle rooftop  
according to an alternate embodiment of the present  
invention.

20 **Figure 5** is a top view of the vehicle display  
apparatus of **Figure 4** showing a video signal generator and  
a quick-disconnect wiring connector which would preferably  
be located within the vehicle.

**Figure 6** is side elevational view of the vehicle display apparatus of **Figure 4**.

**Figure 7** is a perspective view depicting a vehicle display apparatus with plasma screens on the side of a vehicle connected to a video signal generator according to still another embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

With reference now to the figures, and in particular  
5 to **Figures 1-3**, an embodiment of a vehicle mounted variable  
display apparatus in accordance with the present invention  
is shown. Referring to **Figure 1**, display housing 20 shown  
is mounted on the roof of a vehicle 10A provides a sequence of  
10 images to pedestrian viewers and occupants of nearby  
vehicles by rotating display surfaces 22A relative to  
vehicle 10A. Preferably, display surfaces 22A contain  
15 images 30 such as for advertising products to nearby  
observers. As the rotation of the display housing 20  
brings each display surface 22A first into and then out of  
an observer's view, the images 30 form a repeating sequence  
of images for the observer.

Display housing 20, for example, is fastened to  
vehicle 10A with straps 24A (see **Figure 1**) that preferably  
20 extend to the windows of the vehicle 10A. Straps 24A  
preferably enter into the vehicle 10A and fasten within the  
interior of vehicle 10A. Alternatively, the straps 24A may  
terminate in hooks to fasten to the edge of the roof of the  
vehicle 10A. Preferably, straps 24A are made of a strong  
material such as nylon that will hold the display housing

20 in place against forces such as wind resistance and  
abrupt braking or turning of the vehicle 10A. An objective  
of attaching the display housing 20 to be used without  
modification to the vehicle 10A may also be satisfied using  
5 adhesives, suction cups or magnets or other suitable  
methods (not shown). **Figure 2** shows an alternative method  
of fastening the display housing 20 to a rooftop of a  
vehicle using bolts 24B. Attachment with bolts 24B or  
similar fasteners can be more visually appealing without  
10 interfering with window operation and potentially offers a  
more secure attachment to avoid theft or displacement due  
to vehicle movement.

**Figure 2** depicts a side elevation cross-sectional view  
of the display housing 20 of **Figure 1** wherein a motor 27 is  
15 used to impart a rotational motion to display surfaces 22A  
via rotating vertical shaft 28 which is attached to an  
upper interior portion of the display housing 20. The  
motor 27 is mounted to a base which is fastened to vehicle  
10A with bolts 24B. Motor 27 is connected to a power  
source (not shown) internal to the vehicle 10A via wires  
20 29. Motor 27 may be powered by a battery of the vehicle  
10A or by a separate power supply housed either inside  
the vehicle 10A or interior to the display housing 20 (not  
shown). Rotational motion may also be created by fastening

wind-resistive elements (not shown) to display surfaces 22A so that a motion of the air relative to the vehicle 10A (for example when the vehicle 10A is moving) will generate a rotational motion about the vertical shaft 28. Thus, 5 this rotational motion may be generated as a product of airflow due to driving the vehicle 10A. Preferably a speed governor is used to limit the rotational motion so that images 30 are easily readable by observers even at high vehicle speeds.

10 **Figure 3** shows an overhead or top view of display housing 20A having a single display surface 22B in the form of a cylindrical wall rather than the multiple display surfaces 22A of **Figure 1**. A direction of (i.e. clockwise) rotational motion is indicated in **Fig. 3** by the arrow 15 although either direction of rotation may be used.

15 Preferably display surfaces 22A (of **Figure 1**) and 22B (of **Figure 3**) are translucent so that images 30 (see **Figure 1**) may be backlit by an illumination source 26 (see **Figure 2**) for nighttime viewing.

20 **Figures 4-6** depicts another embodiment of a vehicle mounted variable display apparatus in accordance with the present invention is shown. A display housing 20C is mounted on a roof of a vehicle 10B. It should be noted that although the display housing in the embodiments shown

in **Figs. 1-3** and also **Figs. 4-6** are depicted mounted on the rooftop of a vehicle 10A,10B, respectively, the display housing may also be mounted on any generally horizontal surface of a vehicle such as a car trunk or a truck bed.

5 Display screens 22C in **Figs. 4-6** are preferably multi-pixel screens capable of displaying a sequence of images. Preferably, the display screens 22C are television screens. It is further preferred that the display screens 22C are flat-panel plasma screens.

10 It should be further noted that although **Figs. 4-6** depict a display housing 20C with three display screens 22C, any number of screens may be employed, preferably arranged into regular polygonal shapes so that observers in any direction will see at least one of the display screens 22C. Preferably, display housing 20C is adapted to 15 position and support a variable number of the display screens 22C so that one or more display screens 22C may be added or removed from the display housing 20C and the resulting preferably regular polygonal arrangement of 20 display screens 22C is positioned and supported by the existing display housing 20C. Because an increased number of display screens 22C will increase the size of the display housing 20C and also because each display screen 22C preferably displays a separate sequence of images, from

two to eight separate display screens 22C is a preferred practical range for a rooftop-mounted display housing 20C.

Preferably, each display screen 22C receives display

information via a video signal cable 56 (see **Figure 5**).

5 Display information is preferably provided by a video

player 50. Video player 50 preferably features multiple

heads for simultaneously reading multiple video storage

units 52 such as digital video disks (DVDs) as depicted in

**Figure 5.** Preferably, the video player 50 can read at

10 least eight video storage units 52 simultaneously and

generate at least eight distinct resulting video signals to

accommodate each one of the preferred practical range of

display screens 22C for the rooftop-mounted display housing

20C. Preferably, the video player 50 can also generate

15 multiple video signals from a single video storage unit 52

to multiple video signal cables 56 for displaying, if

desired, an identical sequence of images on multiple

display screens 22C. Further preferred is that each video

storage unit 52 contains a series of advertisements which

20 may be read sequentially or randomly for display on one or

more of the display screens 22C. Still further, it is

preferred that the video player 50 be able to direct a

video signal generated from reading any one of the video

storage units 52 to any one of attached video signal cables

56. It should be noted that although Fig. 5 shows the video signal cables 56 transmitting signals from video player 50 to display screens 22C, wireless transmission of the video (and audio) signal or other transmission means 5 may also be used.

Preferably, the video signal cables 56 are bound into a single bundle 54 for ease of installation and removal. Preferably this bundle 54 uses a wiring connector 60 for quick connection and disconnection of all video signal cables 56. The wiring connector 60 preferably comprises two interlocking pieces, each piece equipped to terminate preferably eight video signal cables 56 in a manner that electrically isolates each of the video signal cables 56 from each other, but allows electrical connection to a corresponding video signal cable 56 terminated in the mating piece of the wiring connector 60. In this manner a single interlocking step will allow or prevent transmission of multiple video signals via video signal cables 56. Preferably the interlocking is accomplished by engaging threaded male and female pieces of wiring connector 60 with a twisting motion, although other suitable methods of interlocking such as clasps may be used.

Figure 7 depicts another embodiment of the present invention with display screens 22C (which are the same type

of display screens as shown in **Figures 4-6**) mounted or connected to generally vertical surfaces of a vehicle 10C and video player 50 within vehicle 10C for generating sequences of images for display on the vertical display screens 22C. Preferably the display screens 22C are substantially flat television screens to allow display of a sequence of images to pedestrian viewers without a hazardous protrusion of the display screens 22C outward from the surface of the vehicle 10C or alternatively consuming a large amount of interior space of the vehicle 10C with conventional television bodies. Preferably, the display panels 22C are easily removable or repositioned, for example, using straps (not shown) over the roof of vehicle 10C or using adhesives, magnetism or suction devices (not shown).

Although **Fig. 7** shows one display panel 22C on each side of the vehicle 10C, other arrangements can be made using the present invention, including but not limited to multiple display screens 22C on each side of the vehicle 10C. The display screens 22C may be mounted on any substantially vertical surface of the vehicle 10C such as the back of a van or truck, a tailgate of a pickup truck, a substantially vertical front grille area, or covering a wheel, for example.

While the invention has been particularly shown and described with reference to the preferred embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form, and details 5 may be made therein without departing from the spirit and scope of the invention. For example, it may be desired to use two tiers of display screens on a vehicle rooftop. It may also be desired to use a combination of display screens mounted on both horizontal and vertical surfaces of a 10 vehicle.